



University of Hawaii at Manoa

Hawaii Natural Energy Institute
Holmes Hall 246 • 2540 Dole Street • Honolulu, Hawaii 96822

October 21, 1990

Mr. Duane Kanuha
Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Kanuha:

As required in the County of Hawaii Planning Commission's geothermal resources permit (GRP 89-1), we have enclosed five (5) copies each of the October, 1990 monthly report.

If you have any questions, please call me at 522-5620.

Sincerely,

Harry Olson
Hawaiian Electric Industries/
Spark Matsunaga Fellow in
Geothermal Energy Research

Enclosure: October monthly report

OCTOBER 1990 MONTHLY REPORT

Scientific Observation Hole (SOH) Program

Geothermal Resource Permit: GRP 89-1

Lilewa, Kapoho, and Halekamahina, Hawaii

TMK: 1-2-10:01; 1-4-01:02; and 1-4-02:32

Hawaii Natural Energy Institute

University of Hawaii

November 1990

SUMMARY

Drilling continued at SOH 1, throughout the month of October, 1990. At the beginning of the month the depth of the hole was at 3377 feet and the ending depth was 4181 feet, an interval of 804 feet. Drilling was impeded by poor drilling conditions, which included hard and highly fractured rock, short core runs and bit life, which resulted in extremely slow and expensive penetration rates. SOH 2 and SOH 3 remain in the permitting stage awaiting grading and grubbing permits to be issued by the County and State. During October, a six foot high fence was erected around the SOH 4 wellhead and is now in place.

I. INTRODUCTION

This document presents a monthly report to the County of Hawaii Planning Department to support the Scientific Observation Hole (SOH) program in the Kilauea Middle and Lower East Rift zones. The SOHs are for scientific observation purposes only and will not be flow-tested or produced. The information to be gained from the SOHs will provide an assessment of subsurface geological conditions, groundwater level and composition, temperature, drilling conditions, an inventory of possible mineral and geothermal resources, and an eruptive history of the island to the the depth drilled.

This report addresses: occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility; performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed; and emission measurements.

II. BACKGROUND

The County of Hawaii Planning Commission approved, on August 8, 1989, a geothermal resource permit application (GRP 89-1) to drill scientific observation Holes (SOHs) in the Kilauea middle and lower east rift zone. This document meets the requirement of GRP 89-1, condition 6:

"The petitioner shall maintain a record in a permanent form suitable for inspection and five (5) copies shall be filed with the Planning Department on a monthly basis during

drilling and for six (6) months after the completion of drilling to establish a hole specific baseline and such record shall be available to the community. The record shall include:

- a. Occurrence and duration of any start-up, shut-down, and operation mode of any SOH/facility.
- b. Performance testing, evaluation, calibration checks, and adjustment and maintenance of the continuous emission monitor(s) that have been installed.
- c. Emission measurements reported in units compatible with applicable standards/guidelines."

As planned, four holes are scheduled to be drilled along the Kilauea East Rift Zone on the Big Island of Hawaii. Three of the Big Island holes (SOHs 1, 2, and 4) are on agriculture land and have been permitted by the County of Hawaii Planning Commission. The fourth hole, designated SOH 3, is on conservation land and has been permitted by the State and the County. SOH activities under Conservation District Use Permit (HA 12/20/85 - 1830) issued to the Estate of James Campbell have been approved.

III. SOH 1 SITE

Drilling Activity

Tonto Drilling Services, Inc. continued drilling activities to a depth of 4181 feet for a penetration of 804 feet during this reporting period. The drilling penetration rate and bit life

remain low due to difficult drilling conditions, including highly fractured rock, caving problems and core barrel blockage.

Monitoring Program - Air Quality

The air quality monitoring station provides a continuous record of atmospheric H₂S concentrations when interfaced with a data logger or chart recorder. The unit is located in a utility container on-site. Power for the monitoring equipment is provided by the drill rig system.

This station operated normally throughout the month with only minor data breaks due to shut down of the drill rig for maintenance. Calibrations were routine and there were no major data gaps. Total data capture was 100% (see Appendix for details).

Monitoring Program - Meteorological

Continuous wind speed and directional measurements are being made with a recording wind speed/direction sensor system. A data logger and back-up pressure-sensitive recorder is being used to record wind speed and direction data. The unit is located in a utility container on-site and power is provided by the drill rig system.

This station operated normally throughout the month. Calibrations were routine and there were no major data gaps. Total data capture was 100% (see Appendix for details).

Monitoring Program - Noise

One noise monitoring station is located at the SOH 1 site during drilling. This station operated normally for the majority of the month with only minor loss of data due to mechanical problems.

A second noise station is located at the Laughlin residence, about a quarter mile west of the SOH 1 drill site. Instrument malfunction and loss of calibration made the consistency of results questionable. The instrument has been recalibrated and is currently operational.

A third noise monitoring station is installed at the Pommerenk residence, about a mile east of the SOH 1 site. This unit was removed for complete servicing on September 10, 1990. A weather/security box was built and the unit reinstalled October 5, 1990. This monitor is powered by solar charged batteries, which required adjustments, but now seems to be functioning normally.

Emissions Reports

An H₂S monitor is located on-site. The average H₂S level measured is about 1 ppb. The Colortek sensors show no indication of any emissions from the well.

IV. SOH 2 SITE

No drilling activity has been initiated. Ambient noise monitoring is being prepared for the SOH 2 site. Findings of the

VI. SOH 4 SITE

Drilling Activity

Drilling is completed and the hole is shut in at a depth of 6,562 feet. County of Hawaii landfill officials found the mud pit material unsuitable (too wet) for their uses and Department of Health officials have given approval to bury the material on-site. Planting of ohia seedlings from the DLNR nursery at the site is scheduled for the near future. A six foot fence erected around the wellhead.

Monitoring Program -

Air Quality, Meteorological, Noise and Emissions have been terminated at the site, as drilling activities are completed.

APPENDIX
MAINTENANCE REPORTS

ALPHA MICROSYSTEMS

1550 Akolea Place
Hilo, Hawaii 96720
(808) 935-7985

HAWAII NATURAL ENERGY INSTITUTE
2540 Dole Street
Honolulu, HI 96822

Attn Arthur S. Seki

November 6, 1990

Dear Art,

This report covers the period Oct. 1, to Oct. 31, 1990.

GILMAN HAI. There was a 15 hour data loss on Oct. 7-8 due to running out of Lead Acetate tape. There was also a loss of 57 hours on Oct. 22-24 due to chart recorder jam. Also 3 hours was lost to minor power outages. A major component (Timer/Memory circuit board) became unstable and was discovered during routine maintenance and before there was any data loss. Installed the last available replacement board for this instrument. Now operating normally. Total data capture for October was 90%.

SOH-1 HAI. This instrument operated normally during the entire month with only minor data breaks due to shut down of the drill rig for maintenance. Calibrations were stable and required only minor adjustments. Total data capture was 100%.

WOODS HAI. Only 2 hours data was lost at this station during October because of a minor power outage. The instrument continues to operate normally, although it requires more frequent calibration adjustments than usual. Total data capture was 99%.

WOODS MET. There was a loss of 4 hours data for all parameters on Oct. 20 due to a power interruption at the translator housing. I believe that this was caused inadvertently by the residents. Both Temperature and Wind Direction are becoming increasingly unstable and it is doubtful that the sensors will continue to operate till the end of the year. Total data capture at this station was 99%.

T.P. MET. A substantial data loss at this station of 97 hours occurred on Oct. 15-19. The underlying reason for this much loss was a simple chart jam. When found, the chart recorder was repaired, but not sufficiently tested, so it promptly jammed again. Other than the chart recorder problem, all parameters at this station operated normally, and calibrations were routine. Total data capture was 87%.

SOX-1 MET. This station operated normally throughout the month. Calibrations were routine and there were no major data gaps. Total data capture was 100%.

SOX-4 COLORTEK. These cards were routinely replaced and did not give any indications of color change.

Enclosed:

H2S Data Reduction for Gilman, SOX-4 and Woods Stations
for October 1990.

Average, Maximum and total H2S for the above stations.

Meteorological Data Reduction for Woods, T.P., and SOX-1.
October 1990.

Synopsis of Woods and T.P. Met Data for October, 1990.

Copy of Station Logs, October, 1990.

October Invoice

SUPPLEMENTARY BILLING

J-276	Wednesday, 10-3-90 SOH-1 Operating normally. POMERINCK Partially installed shelter for sound station. Too wet to install instruments, test and calibrate. LOUGHLIN Operating normally.	3.00	
J-278	Friday, 10-5-90 SOH-1 Operating normally. Full calibration. POMERINCK Relocated sound station shelter by request of the Pomerincks. Finished instrument installation, tested and calibrated. Station now on line. LOUGHLIN Operating normally. Full calibration but no adjustments were required. COLORTEC Replaced colortec cards. No color change visible.	3.00	
J-279	Monday, 10-08-90 SOH-1 Two chart jams. Cleared itself. POMERINCK Operating normally. Inadvertantly left chart speed at 30 cm/hr instead of 2 cm/hr...reset. LOUGHLIN Operating normally	2.00	
J-283	Wednesday, 10-10-90 SOH-1 Chart jammed twice, but cleared itself again. POMERINCK Operating normally. Installed and tested a power strip to control voltage from solar-panel to instruments and batteries. LOUGHLIN Operating normally. Chart & pen O.K.	3.00	38.05
J-285	Friday, 10-12-90 SOH-1 Pen ran dry. Some data lost. Ran full calibration. Replaced chart recorder with unit borrowed from SAIC to attempt to find out cause of jamming. POMERINCK Operating normally. Ran full calibration. Replaced directional mike setup with omni-directional unit. LOUGHLIN Operating normally. Ran full calibration. COLORTEC Replaced Colortec cards. No visible color change.	3.00	
J-288	Monday, 10-15-90 SOH-1 Operating normally, renewed chart.	2.00	

POMERINCK

Operating normally, renewed chart.

LOUGHLIN

Pen ran dry. Lost some data. Renewed chart.

J-290 Wednesday, 10-17-90 2.00

SOH-1

Some data lost because pen ran dry.

POMERINCK

Operating normally

LOUGHLIN

Readings seem abnormally high. Meter was set on Fast, instead of slow response.

J-292 Friday, 10-19-90 3.00

SOH-1

Operating normally. Full calibration.

POMERINCK

Operating normally. Full calibration.

LOUGHLIN

Readings abnormally high. Replaced microphone and preamplifier. Full calibration. Normal at 110.0 db, but a zero at 60 db difficult because of high ambient.

COLORTEC

Replaced Colortec cards. No color change visible.

J-295 Monday, 10-22-90 4.00

SOH-1

Operating normally. Reinstalled our recorder which has been operating without a hitch for 10 day, and returned borrowed recorder to Ormat.

POMERINCK

Some data loss here because one of the sound meter batteries did not charge from the solar panel. Replaced battery and checked circuits. Everything seems normal.

LOUGHLIN

Very high readings but everything seems normal. Got some assistance from Kim Born and his spare meter and calibrator. Eventually found that the connecting cable between the meter and the microphone had gone dingy. Replaced cable, tested and calibrated...O.K. The readings with the defective cable were about 15 db above normal.

J-297 Wednesday, 10-24-90 2.00

SOH-1

Operating normally

POMERINCK

Operating normally but blew sound meter while checking solar panel & batteries. Station now inoperative.

LOUGHLIN

Operating normally but pen ran dry. Some data lost.

SOH-1

Operating normally. Ran full calibration.

POMERINCK

Installed sound meter that was borrowed from SAIC.

Our meter had to be sent to Quest for repair.

LOUGHLIN

Operating normally. Ran full calibration but no adjustments were required.

COLORTEC

Replaced colortec cards. No visible color change.

J-302 Monday, 10-29-90 2.00

SOH-1

Operating normally,

POMERINCK

Operating normally.

LOUGHLIN

Operating normally.

J-304 Wednesday, 10-31-90 2.00

SOH-1

Chart jammed again. Exchanged recorders with Loughlin.

POMERINCK

Operating normally. Adjusted charge circuits.

LOUGHLIN

Operating normally. Exchanged recorders with SOH-1.

J-306 Friday, 11-2-90 3.00

SOH-1

Chart jammed, some data lost. Paper at fault, not the recorder. Full calibration.

POMERINCK

Operating normally. Full calibration, no problems.

LOUGHLIN

Operating normally. Full calibration, no problems.

COLORTEC

Replaced colortec cards. No color change apparent.

J-274 Monday 10-1-90

Woods HAIRange ϕ - 3 ppb

Flow steady @ 3.0, Renewed Chart - Lead Acetate O.K.

Tygon Dry - Pump + Bubbles O.K.

Check Steady @ 21.5%,

Optics 1600-1590, down 10 μ , No Adj.

Range - High 1:1 Low 1:1

Zero Calib 12 21 \pm 1 ϕ

Span Calib Exp 50 50 50 50 50

Act 25 39 48 50 50

Woods Met

Operating Normally - Renewed Chart

TP Met

Operating Normally - Renewed Chart - Replaced Beff - 12.77

SOH-1 Met

Operating Normally - Renewed Chart

Gilman HAIRange ϕ - 2 ppb

Flow steady @ 3.0, Renewed Chart - Lead Acetate O.K.

Tygon Dry - Pump + Bubbles O.K.

Check 18.1%, down 190

Optics 1980-1930, down 10 μ , No adj.

Range - High 1:1 Low 1:1

Zero Calib 12 \pm 2 ϕ SOH-1 HAIRange ϕ - 2 ppb

Flow steady @ 3.0, Renewed Chart - Lead Acetate O.K.

Tygon Dry - Filled Bubbles - Pump O.K.

Check 28.6%, up 10

Optics 2100-2130, up 30 μ , Adj. to 2130-2130

Range - High 1:1 Low 1:1

Zero Calib 28 7 1 ϕ ϕ

J-276 Wednesday 10-3-70

Woods HAIRange ϕ - 2 ppb

Flow Steady @ 3.0, chart + Lead Acetate OK

Tygon Day - Filled Bubbles - Pump OK

Check 22.0%, up .5%

Optics 1610-1600, down 10 Ω , adj. to No adj.

Range - High 1:1 Low 1:1

Zero Calib 21 5 1 1 0

Woods Met

Operating Normally - chart OK

I.P. Met

Operating Normally - chart + Batt OK

SON-1 Met

Operating Normally - chart OK

Bilman HAIRange ϕ - 2 ppb

Flow Steady @ 3.0, chart + Lead Acetate OK

Tygon Day - Pump + Bubbles OK

Check 18.4%, up .3%

Optics 1940-1950, up 10 Ω , adj. to 1950-1950

Range - High 1:1 Low 1:1

Zero Calib 17 3 1 0

SON-1 HAIRange ϕ - 2 ppb

Flow Steady @ 3.0, chart + Lead Acetate OK

Tygon Day - Pump + Bubbles OK

Check 28.8%, up .2%

Optics 2140-2170, up 30 Ω , adj. to 2170-2170Range - High 1:1 Low 1:1 (240 Ω low, adj. for 1:1)Zero Calib 25 11 2 1 (240 Ω) 0

J-278 Friday 10-5-70

Woods HAIRange ϕ - 2ppb

Flow steady @ 3.0, Chart + Lead Acetate OK

Tygon Dry - Pump + Bubbles OK

Check 21.5%, down .5%

Optics 1610-1600, down 10, No adj.

Range - High 1:1 Low 1:1

Zero Calib 18 4 2 1 (Zero PEP) ϕ Woods Met

Operating Normally - Renewed Chart

TP Met

Operating Normally - Chart + Batt OK

SON-1

Operating Normally - Chart OK

Gilman HAIRange ϕ - 2ppb

Flow steady @ 3.0, Chart + Lead Acetate OK

Tygon Dry - Pump - Bubbles OK

Check steady @ 18.4%

Optics steady @ 1950-1950

Range - High 1:1 Low 1:1

Zero Calib 12 4 ϕ 1 ϕ

Span Calib - Exp 50 50 50 50 50

Act 31 46 49 49 50

SON-1 HAIRange ϕ - 2ppb

Flow steady @ 3.0, Chart + Lead Acetate OK

Tygon Dry - Pump + Bubbles OK

Check 28.6%, up .2%

Optics 2170-2180, up 10, adj. to 2180-2180

Range High 1:1 Low 1:1

Zero Calib 27 9 2 ϕ Color Tec

Replaced Color Tec Cands - No Color Change visible.

J-281 Monday 10-8-90

Woods HAT

Range 0 - 2 ppb

Flow steady @ 3.0, chart O.K. - Replaced lead Acetate

Tygon Dry - Pump + Bubbles O.K.

Check 21.6%, up .1%

Optics steady @ 1610-1610

Range - High 1:1 Low 1:1

Zero Calib 18 7 3 1 0

Woods Act

Operating Normally - chart O.K.

T.P. Met

Operating Normally - chart + Bath O.K.

SON-1 Met

Operating Normally - chart O.K.

Gilman HAT

Range 0 - 2 ppb

Flow steady @ 3.0, chart O.K. - Replaced lead Acetate

Tygon Dry - Pump + Bubbles O.K.

Check 17.6%, down .8% - Adj. cycle time $\frac{1}{2}$ Right

Optics 1960-1950, down 10-2, No Adj.

Range - High 1:1 Low 1:1

Zero Calib 16 5 2 0

SON-1 HAT

Range 0 - 2 ppb

Flow steady @ 3.0, chart O.K. - Replaced lead Acetate

Tygon Dry - Pump + Bubbles O.K.

Check 28.6%, up .2%

Optics 2180-2200, up 20-2, adj. to 2200-2200

Range - High 1:1 Low 1:1

Zero Calib 26 4 -0 0

Span Calib - Exp 50 50 50 50 50

Act 28 31 47 59 50

J-283 Wednesday 10-10-90

Woods HAI

Range 0 - 2 ppb

Flow steady @ 3.0, Renewed Chart - Lead Acetate OK

Tygon Dry - Filtered Bubbles - Pump OK

Check 21.4%, down .2%

Optics Steady @ 1610-1610

Range - High 1:1 Low 1:1

Zero Calib 20 4 2 0

Woods Met

Operating Normally - Chart OK

T.P. Met

Operating Normally - Chart & Bath OK

30 H-1 Met

Operating Normally - Renewed Chart.

Elman HAI

Range 0 - 3 ppb

Flow Steady @ 3.0, Renewed Chart - Lead Acetate OK

Tygon Dry - Pump & Bubbles OK

Check Steady @ 17.6%

Optics 1960-1950, down 10-2, No adj.

Range - High 1:1 Low 1:1

Zero Calib 16 2 3 1 0

50 H-1 HAI

Range 0 - 2 ppb

Flow Steady @ 3.0, Renewed Chart - Lead Acetate OK

Tygon Dry - Pump & Bubbles OK

Check 2200-2210, up 10-5, adj to 2210-2210

Range - High 1:1 Low 1:1

Optics 28.4%, down .2%

Zero Calib 26 9 1 0

J-285 Friday 10-12-90

Woods HATRange ϕ - 2 ppb

Flow steady @ 3.0, chart + Lead Acetate O.K

Tygon Dry - Pump + Bubbles O.K

Check 21.3%, down .1%

Optics 1630-1640, up 10 μ , adj to 1640-1640

Range - High 1:1 Low 1:1

Zero Calib 19 6 2 0

Span Calib - Exp	50	50	50	50	(span Pot)	50	50
Act	21	38	42	45	(1/2 Right)	49	50

Woods Met

Operating O.K, but WD + Temp getting unstable - Removed Chart

T.P. Met

Operating Normally - Removed Chart - Batt Weak

SOH-1 Met

Operating Normally - elum O.K

Elman HATRange ϕ - 3 ppb

Flow steady @ 3.0, chart + Lead Acetate O.K

Tygon Dry - Pump + Bubbles O.K

Check adjusted to 16.5 volts

Optics steady @ 1960-1960

Range - High 1:1 Low 1:1

Zero Calib 16 6 3 1 1 (Zero Pot) 0

SOH-1 HATRange ϕ - 2 ppb

Flow steady @ 3.0, chart + Lead Acetate O.K

Tygon Dry - Pump + Bubbles O.K

Check 28-27%, down .2%

Optics steady @ 2210-2210

Range - High 1:1 Low 1:1

Zero Calib 26 9 3 0 0

J-288 Monday 10-15-90

Woods HAI

Range 0-3 ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 21.7%, up .4%

Optics 1610-1620, up 10 μ , adj to 1620-1620

Range High 1:1 Low 1:1

Zero calib 19 6 1 0

Woods Met

Operating OK, but Rain Gauge was tipped over - Rebalanced and Replaced chart. W.D. or Temp still unstable.

T.P. Met

Operating Normally - Chart OK - Replaced Battery

SOH-1 Met

Operating Normally - Chart OK

Gilman HAI

Range 0-2 ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 16.0%, down .5% and drifting

*

Sample + Hold circuitry defective - will have to replace Analyzer OR at Best, timer/memory board

Optics 1970-1930, down 40 μ , adj to 1940-1940

Range - High 1:1 Low 1:1

Zero calib 18 6 2 -1 (zero pot turned right) 0

Span Calib - Exp 50 50 50 50 50 } DRIFT 2%
Act 32 46 49 51 49 }SOH-1 HAI

Range 0-2 ppb

Flow steady @ 3.0, chart + Lead Acetate OK

Tygon Dry - Filled Bubbler - Pump OK

Check 28.4%, up .2%

Optics steady @ 2220-2220

Range - High 1:1 Low 1:1

Zero Calib 26 9 3 0 0

J-290 Wednesday 10-17-90

Woods HATRange ϕ - 2 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 21.2%, down .5%

Optics 1630-1610, down 20 μ , adj To 1610-1610

Range - High 1:1 Low 1:1

Zero Calib 20 4 - ϕ ϕ Woods Met

Operating Normally - Chart O.K.

T.P. Met

Operating Normally - Chart + Bubbler O.K.

SOH-1 Met

Operating Normally - Renewed Chart

~~Edman HAT~~ SOH-1 HATRange ϕ - 3 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 23.5%, up .1%

Optics 2230-2240, up 10 μ , adj To 2240-2240

Range - High 1:1 Low 1:1

Zero Calib 27 82 4 ϕ Edman HATRange ϕ - 2 ppb

Flow steady @ 3.0, Renewed Chart, Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 17.5%, up 1.5% - Replaced Timer/Memory Board

Optics 1940-1960, up 20 μ , adj To 1960-1960

Range - High 1:1 Low 1:1

Zero Calib 16 50 10

J-292 Friday 10-19-90

Woods NAIRange ϕ - 2 ppb

Flow steady @ 3.0, Chant & Lead Acetate OK

Desired Tygon - Filled Bubbler - Pump OK

Check 22.0%, up .8%

Optics steady @ 1630-1630

Range High 1:1 Low 1:1

Zero Calib 18 7 3 1 0

Wood Met

Operating Normally - Chant OK

T.P. Met

* Chant Jammed - Lost 48 hours - Renewed Chant - Bott OK

SON-1 Met

Operating Normally - Renewed Chant

Column NAIRange ϕ - 3 ppb

Flow adj to 3.0 from 3.2, Replaced Chant - Lead Acetate OK

Desired Tygon - Pump & Bubbler OK

Check 20.0%, up 2.5%

Optics 1960-2000, up 40, adj to 2000-2000

Range High 1:1 Low 1:1

Zero Calib 12 6 3 0 0

SON-1 NAIRange ϕ - 3 ppb

Flow steady @ 3.0, Chant & Lead Acetate OK

Tygon Dry - Pump & Bubbler OK

Check 23.4%, down .1%

Optics 2250-2260, op 10, Adj to 2260-2260

Range High 1:1 Low 1:1

Zero Calib 21 4 0 -0 0

Span Calib - Exp 50 50 50 50

Adj 35 48 48 50

J-295 Monday 10-22-90

Woods HAIRange ϕ - 3 ppb

Flow steady @ 3.0, chaut O.K. - Replaced Lead Acetate

Tygon Dry - Pump + Bubbler O.K.

Check 22.1%, up .1%

Optics 1610-1620, up 10-2, adj. to 1610

Range High 1:1 Low 1:1

Zero Calib 19 5 2 0 0

Span Calib - Exp 50 50 50 50 50

Act 29 39 46 49 50

Woods Met

Operating Normally - chaut O.K.

T.P. Met

Operating Normally - Chaut + Batt O.K.

SON-1 Met

Operating Normally - Chaut O.K.

Gilman HAIRange ϕ - 3 ppb

Flow steady @ 3.0, chaut O.K. - Replaced Lead Acetate

Tygon Dry - Pump + Bubbler O.K.

Check Steady @ 20.0%

Optics Steady @ 2000-2000

Range - High 1:1 Low 1:1

Zero Calib 19 5 0 1 0

SON-1 MetRange ϕ - 3 ppb

Flow steady @ 3.0, chaut O.K. - Replaced Lead Acetate

Tygon Dry - Pump + Bubbler O.K.

Check 23.62, up .2%

Optics steady @ 2250-2250

Range - High 1:1 Low 1:1

Zero Calib 26 -2 3 1 0

J-297 Wednesday 10-24-70

Woods HAIRange ϕ - 2 ppb

Flow adj. To 3.0, Replaced Chart, Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 21.8%, down .3%

Optics 1620-1590, down 30 Ω , adj. to 1590-1590

Range - High 1:1 Low 1:1

Zero Calib 18 7 3 ϕ Woods Met

Operating Normally - Chart O.K.

T.P. Met

Operating Normally - Chart + B&T O.K.

SON-H Met

Operating Normally - Chart O.K.

Edman HAIRange ϕ - 2 ppb

* Chart Jammed - Lost Data

Flow Steady @ 3.0, Renewed Chart - Lead Acetate O.K.

Drained Tygon - Filled Bubbler - Pump O.K.

Check 17.3%, down 2.7%

Optics 2010-2020, up 10 Ω , adj. to 2020-2020

Range - High 1:1 Low 1:1

Zero Calib 17.5 3 ϕ SON-H HAIRange ϕ - 2 ppb

Flow steady @ 3.0, Renewed Chart - Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 28.4%, down .2%

Optics 2260-2250, down 10 Ω , No adj.

Range - High 1:1 Low 1:1

Zero Calib 25 9 6 ϕ

J-279 Friday 10-26-90

Woods NAT

Range 0-2000

Flow steady @ 3.0, chart + lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 21.6%, down .2%

Optics 1590-1620, up 30, adj. to 1620-1620

Range - High 1:1 Low 1:1

Zero Calib 22 5 1 0

Woods Met

Operating Normally - Renewed Chart

T.P. Met

Operating Normally - Renewed Chart - Batt 125%

SON-1 Met

Operating Normally - Chart O.K.

Billman HAI

Range 0-2000

Flow adj. to 3.0 from 2.6, chart + lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 17.5%, up .2%

Optics 2020-2030, up 10, adj. to 2030-2030

Range - High 1:1 Low 1:1, adj. for 1:1

Zero Calib 13 7 2 1 0

Span Calib - Exp 50 50 50 50

Act 35 42 49 50

SON-1 HAI

Range 0-2000

Flow steady @ 3.0, chart + lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 28.1%, down .3%

Optics steady @ 2250-2250

Range - High 1:1 Low 1:1

Zero Calib 24 6 2 1 0

Colantec

Replaced Colantec Cands - No visible color change.

J-302 Monday 10-29-90

Woods NAIRange ϕ - 3 ppb

Flow steady @ 3.0, Chant + Lead Acetate OK

Tygon Dry - Filled Bubbler - Pump OK

Check 21.5%, down .1%

Optics steady @ 1610-1610

Range - High 1:1 Low 1:1

Zero Calib 18 8 3 0

Woods Met.

Operating Normally - Chant OK

T.P. Met

Operating Normally - Chant + Batt OK

SOH-1 Met

Operating Normally - Chant OK

Gilman NAIRange ϕ - 2 ppb

Flow adj to 3.0, Chant + Lead Acetate OK

Tygon Dry - Pump Work - Bubbler OK

Check 17.4%, down .1%

Optics 2040-2010, down 30-2, adj to 2020-2020

Range - High 1:1 Low 1:1

Zero Calib 6 14 1 -0 (Zero set 1/2 right) 0

SOH-1 NAIRange ϕ - 2 ppb

Flow adj to 3.0, Replaced Chant - Lead Acetate OK

Tygon Dry - Pump + Bubbler OK

Check 28.3%, up .2%

Optics steady @ 2250-2250

Range High 1:1 Low 1 ppb Low, adj for 1:1

Zero Calib 26 5 1 0

Span Calib - Exp	50	50	50	50	(span set)	50
Act	24	37	48	48	(1/2 right)	50

J-304 Wednesday 10-31-90

Woods HAIRange ϕ - 2ppb

Flow steady @ 3.0 - Renewed Chart - Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 26.8%, up .2%

Optics 1610-1600, down 10 μ , No adj.

Range - High 1:1 Low 1:1

Zero Calib 20 4 2 ϕ Woods Met

Operating Normally - Chart O.K.

J.P. Met

Operating Normally - Chart + Buff O.K.

SOH-1 Met

Operating Normally - Renewed Chart

Gilman HAIRange ϕ - 2ppb

Flow steady @ 3.0 - Renewed Chart - Lead Acetate O.K.

Tygon Dry - Pump + Bubbler O.K.

Check 17.8%, up .4%

Optics steady @ 2010-2010

Range - High 1:1 Low 1:1

Zero Calib 16 5 2 -0 (2-zero for 1/2 error) ϕ SOH-1 ~~Met~~ HAIRange ϕ - 2ppb

Flow steady @ 3.0, Chart + Lead Acetate O.K.

Tygon Dry - Filled Bubbler - Pump O.K.

Check steady @ 28.3%

Optics 2240-2230, down 10 μ , No adj.

Range - High 1:1 Low 1:1

Zero Calib 10 21 4 1 ϕ

J-275 Tuesday, 10-2-90
Purchased Solar Panel, Misc. clamps, fittings and hardware.
Prepared cables and tested.

J-276 Wednesday, 10-3-90
SOH-1 0830 Clouds 100%, rain WS&DIR 280 @ 2-3
Operating normally. No problems
LOUGHLIN 0940 Clouds 100%, rain WS&DIR 300 @ 2-3
Operating normally. No problems.
POMERINCK 0900 Clouds 100%. rain WS&DIR 300 @ 2-3
Installed instrument shelter, shelter stand and batteries.
Too wet to attempt to install and calibrate instruments.

J-278 Friday, 10-5-90
SOH-1 0820 Clouds 60% WS&DIR 315 @ 3-4
Operating normally. Replaced pen. Calibrated sound meter
to 110.0 from 109.7. No adjustments required for recorder.
POMERINCK 0900 Clouds 60% WS&DIR 340 @ 5-7
Relocated shelter to top of hill as requested by Mrs.
Pomerinck. Installed instruments, Solar-panel and
batteries. Tested and calibrated.
LOUGHLIN 1010 Clouds 40% WS&DIR 350 @ 8-10
Operating normally. Ran full calibration. No adjustments
required for either meter or recorder.

J-281 Monday, 10-8-90
SOH-1 0825 Clouds 50% WS&DIR 300 @ 2-3
Two jams during the weekend. Some data lost. Jams cleared
themselves.
POMERINCK 0905 Clouds 60% WS&DIR 315 @ 3-4
Operating normally except that I left the recorder
running at 30 cm/hr inadvertently. Replaced chart.
LOUGHLIN 0925 Clouds 70% WS&DIR 325 @ 3-4
Operating normally. Chart & pen O.K.

J-283 Wednesday, 10-10-90
SOH-1 0830 Clouds 75% WS&DIR 340 @ 2-3
Two jams, but recorder cleared itself again.
POMERINCK 0852 Clouds 40% WS&DIR 350 @ 8-10
Operating normally. Installed power-strip to control
power from solar-panel to batteries & instruments.
LOUGHLIN 0945 Clouds 50% WS&DIR 10 @ 8-10
Operating normally. Chart & Pen O.K.

J-285 Friday, 10-12-90
SOH-1 0847 Clouds 80% WS&DIR 20 @ 5-6
Pen ran dry but no jams. Installed chart recorder
borrowed from SAIC. Full Calibration. Adjusted meter
to 110.0 from 100.2. Adjusted recorder zero & span.
Replaced pen.
POMERINCK 0936 Clouds 50% WS&DIR 40 @ 8-10
Operating normally. Replaced directional Mike with
Omni-directional cage. Full calibration. Meter to
110.0 from 110.3. Adjusted recorder down 1 db.
Checked solar panel and adjusted charge to batteries.
LOUGHLIN 1045 Clouds 60% WS&DIR 50 @ 8-10
Operating normally. Full calibration. No adjustments
required for meter or recorder.

J-288 Monday, 10-15-90
SOH-1 0820 Clouds 60% WS&DIR 300 @ 2-3
Operating normally. Renewed chart.
POMERINCK 0850 Clouds 60% WS&DIR 320 @ 3-5
Operating normally. Renewed chart. Batteries O.K.
LOUGHLIN 0930 Clouds 60% WS&DIR 330 @ 3-5
Operating normally, but pen ran dry. Replaced pen
and renewed chart.

NOTE...

The recorder that was removed from SOH-1 has been running continuously since Friday without a jam or problem of any kind. I will continue to run the recorder on the test bench until something happens.

J-290 Wednesday, 10-17-90
 SOH-1 0845 Clouds 100%, rain WS&DIR 330 @ 2-4
 Normal operation except that pen ran dry. Replaced.
 POMERINCK 0910 Clouds 100%, rain WS&DIR 300 @ 2-4
 Operating normally. Readings include farm tractor noise.
 Drill site and pad clearing noise inaudible or masked.
 LOUGHLIN 0940 Clouds 100% WS&DIR 300 @ 2-4
 No readings less than 40db in past 48 hours. Also found
 meter set on FAST response instead of on SLOW. Reset and
 tested, but readings still seem high.

J-292 Friday, 10-19-90
 SOH-1 0845 Clouds 95%, rain WS&DIR 50 @ 5-7
 Operating normally. Serviced batteries and Solar panel.
 Full calibration. Adjusted meter to 110.0 from 109.7.
 Slight increase adjustment for recorder.
 POMERINCK 0915 CLOUDS 100% WS&DIR 60 @ 4-6
 Operating normally. Full calibration. Adjusted meter to
 110.0 from 110.2. Did not adjust recorder although zero
 is 1/2 db down from chart zero.
 LOUGHLIN 1045 Clouds 90% WS&DIR 95 @ 3-5
 Readings seem very high. Full calibration. Adjusted meter
 to 110.0 from 109.7. Difficult to obtain zero on chart
 recorder because of high ambient level (around 60 db).
 I replaced microphone and pre-amp, but this made no
 difference. I believe something is wrong.

J-295 Monday, 10-22-90
 SOH-1 0820 Clouds 40% WS&DIR 340 @ 4-5
 Operating normally. Replaced the borrowed recorder with
 our recorder which has operated without a hitch for 10
 days.
 POMERINCK 0920 Clouds 30% WS&DIR 360 @ 5-7
 Recording a practically straight line, no mike response.
 Extensive testing of all components revealed no problem
 until I checked the batteries as a last resort. One of
 the batteries for the sound meter was practically dead.
 I don't know why this battery didn't charge. Replaced
 the battery and restored normal operation. Re-calibrated
 the meter and chart recorder.
 LOUGHLIN 1020 Clouds 50% WS&DIR 20 @ 6-8
 Average readings here 65-70 db. Calibration was fine at
 110.0 db, but could not obtain a zero at 60 db. Every-
 thing seemed O.K. Contacted Kim Born from Ormat to give
 me a hand with his model 2800 and calibrator. Without
 going into detail about everything we did, the bottom
 line is that our readings were about 15 db higher than
 what his meter indicated. The problem turned out to be
 in the cable between the mike and the meter. When I
 replaced the cable, readings returned to normal and I
 was able to obtain a good zero and 110.0. Normal
 operation has been restored now, but I don't know for
 how long the previous data should be considered suspect.

J-297 Wednesday, 10-24-90
 SOH-1 0810 Clouds 50% WS&DIR 295 @ 4-5
 Operating normally. Chart & Pen O.K.
 POMERINCK 0835 Clouds 70% WS&DIR 360 @ 4-5
 Operating normally. While checking solar panel and
 batteries, I accidentally shorted out the leads going
 to the sound meter. Apparently, this blew the meter.
 Removed meter for check and repair. Station now
 inoperative.
 LOUGHLIN 1010 Clouds 80% WS&DIR 20 @ 3-4
 Operating normally but pen ran dry. Replaced pen.

J-299 Friday, 10-26-90
 SOH-1 0805 Clouds 80% WS&DIR 350 @ 5-6
 Operating normally. Replaced chart & Pen. Ran full
 calibration. Meter adjusted to 110.0 from 109.3. Also
 made a slight increase adjustment on recorder.
 POMERINCK 0845 Clouds 50% WS&DIR 360 @ 5-6
 Installed sound meter borrowed from SAIC. Our meter
 was sent to Quest for repair. Ran full calibration of
 meter and recorder. Checked solar panel and batteries.
 LOUGHLIN 0940 Clouds 40% WS&DIR 300 @ 3-5
 Operating normally. Full calibration. Sound meter O.K.
 at 110.0, and no adjustment required for chart recorder.

J-302 Monday, 10-19-90
 SOH-1 0820 Clouds 100%, rain WS&DIR 275 @ 2-4
 Operating normally. No problems
 POMERINCK 0850 Clouds 100% WS&DIR 280 @ 2-4
 Operating normally. Checked batteries & Solar panel.
 LOUGHLIN 0923 Clouds 90% WS&DIR 280 @ 2-4
 Operating normally. No problems.

J-304 Wednesday, 10-31-90
 SOH-1 0815 Clouds 50% WS&DIR 270 @ 2-3
 Chart jammed. Decided to exchange recorder with the
 one at Loughlins. Replaced pen.
 POMERINCK 0840 Clouds 30% WS&DIR 280 @ 4-5
 Operating normally. Adjusted charge circuits.
 LOUGHLIN 0915 Clouds 30% WS&DIR 290 @ 4-5
 Operating normally. Exchanged recorders with SOH-1.

J-306 Friday, 11-2-90
 SOH-1 0820 Clouds 100%, rain WS&DIR 70 @ 2-3
 Chart jammed. Some data lost. Chart paper at fault
 not chart recorder. Full calibration. Adjusted the
 sound meter to 110.0 from 110.3. Recorder was O.K.
 POMERINCK 0915 Clouds 100 % WS&DIR 80 @ 2-3
 Operating normally. Renewed chart, pen O.K.
 Full calibration. Sound recorder O.K. @ 110.0
 Recorder was 3db high. Checked solar panel and
 batteries.
 LOUGHLIN 1000 Clouds 90% WS&DIR Calm
 Operating normally. Renewed chart, pen O.K.
 Full calibration. Adjusted meter to 110.0 from
 110.2. No adjustments to recorder.

DAILY AVERAGE, MAXIMUM AND TOTAL H2S READINGS

October 1 To October 31, 1990

Date	Gilman			SOH-1			Woods		
	Avg	Max	Total	Avg	Max	Total	Avg	Max	Total
1001	1	3	31	1	2	22	2	3	36
1002	1	3	28	1	2	17	2	3	39
1003	1	2	34	2	3	37	1	2	34
1004	1	2	30	1	2	25	2	2	39
1005	1	2	24	1	2	16	1	3	29
1006	1	2	26	1	2	20	1	2	22
1007	1	2	21	1	2	23	1	2	23
1008	1	3	17	1	2	25	1	2	26
1009	2	3	37	1	2	20	1	2	29
1010	2	3	39	1	3	32	1	2	28
1011	2	3	37	1	2	30	1	2	23
1012	1	3	29	1	2	26	2	3	36
1013	1	2	26	1	2	23	1	2	31
1014	1	2	26	1	3	35	1	3	30
1015	1	2	24	2	3	40	1	2	27
1016	1	2	22	2	2	36	1	2	24
1017	1	2	26	2	3	41	1	2	30
1018	1	3	26	2	2	42	1	3	28
1019	1	3	31	2	3	41	1	3	32
1020	1	3	24	1	3	33	2	3	38
1021	1	3	27	1	2	30	1	2	29
1022	-	-	-	1	3	23	2	3	37
1023	-	-	-	1	2	30	1	2	24
1024	1	2	12	1	3	35	1	2	22
1025	1	2	19	1	3	31	1	2	15
1026	1	2	23	1	2	29	1	2	22
1027	1	2	23	1	2	35	1	2	20
1028	1	3	26	1	2	30	1	2	22
1029	2	3	39	1	2	31	1	3	30
1030	1	2	34	1	2	29	1	2	34
1031	2	2	36	1	2	21	1	2	19
	1	3	797	1	3	908	1	3	875

All readings are in parts per billion (ppb)

H2S CHART REDUCTION -- 90H-1 Station

From 10-1-90 to 10-31-90

HOUR:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Avg	Max	Total
1001	1	1	1	1	1	1	1	2	1	1	1	1	1	0	1	2	1	1	0	0	0	1	1	1	1	2	22
1002	0	0	0	0	1	1	0	0	1	1	2	2	1	1	1	1	1	1	1	0	0	0	1	1	1	2	17
1003	1	1	1	1	1	0	1	1	1	2	2	2	2	3	3	3	3	2	2	1	1	1	1	1	2	3	37
1004	1	1	1	2	1	1	1	0	1	1	2	2	2	2	2	1	1	1	1	0	0	1	0	0	1	2	25
1005	0	0	1	1	1	1	0	0	0	1	0	0	1	2	2	2	2	1	1	0	0	0	0	0	1	2	16
1006	1	1	0	0	0	0	1	0	1	1	2	1	2	2	2	1	1	0	1	1	0	1	1	0	1	2	20
1007	0	0	1	1	1	0	1	1	1	1	1	1	1	2	2	2	2	2	1	0	1	0	1	0	1	2	23
1008	0	1	0	0	0	0	0	0	1	2	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	2	25
1009	0	0	0	1	0	0	1	0	2	2	1	1	1	2	2	2	2	1	1	0	0	0	1	0	1	2	20
1010	0	0	1	0	0	1	1	1	1	2	2	2	2	3	3	2	2	2	1	1	1	2	1	1	1	3	32
1011	2	1	1	1	1	1	1	2	1	2	1	1	2	2	1	1	2	1	1	1	1	1	1	1	1	2	30
1012	2	1	1	1	2	2	2	1	2	2	1	2	1	1	0	1	0	1	1	1	1	0	0	0	1	2	26
1013	0	1	1	1	1	0	1	1	1	2	1	1	2	2	1	1	1	1	0	0	1	1	1	1	1	2	23
1014	1	1	1	0	1	0	1	1	1	1	1	2	2	2	1	2	2	2	2	2	2	3	2	2	1	3	35
1015	2	2	1	1	0	1	1	2	1	2	2	2	2	3	2	2	3	2	2	2	1	1	2	1	2	3	40
1016	1	2	2	2	2	1	2	1	2	0	0	1	2	1	2	2	2	2	2	2	2	2	1	0	2	2	36
1017	0	1	1	1	1	1	2	2	1	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	3	41
1018	2	2	2	2	2	1	2	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	1	2	2	42
1019	2	2	1	2	1	2	2	2	2	2	2	3	2	3	3	2	1	1	1	1	1	1	1	1	2	3	41
1020	0	1	2	1	1	1	0	1	1	1	1	2	2	2	3	2	2	2	2	2	1	1	1	1	1	3	33
1021	1	1	2	1	1	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	0	0	1	1	1	2	30
1022	1	0	0	0	1	0	1	1	1	1	1	1	1	2	3	2	2	1	1	1	1	1	0	0	1	3	23
1023	1	1	0	1	1	1	2	2	2	1	1	2	1	2	2	2	2	2	1	1	1	0	1	0	1	2	30
1024	1	1	0	0	1	1	1	0	1	2	1	3	2	2	2	2	2	2	2	2	2	2	2	1	1	3	35
1025	2	1	1	0	0	0	0	1	1	1	2	2	2	2	2	1	3	2	2	2	1	1	1	1	1	3	31
1026	0	0	0	0	0	0	1	2	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	2	1	2	29
1027	2	2	1	1	1	1	1	2	2	1	1	2	2	1	2	2	2	2	1	1	1	1	1	2	1	2	35
1028	1	1	2	2	2	1	0	1	1	1	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	30
1029	1	1	1	1	1	1	1	0	2	1	1	2	2	2	2	2	2	2	2	1	1	1	1	0	1	2	31
1030	1	1	1	0	0	1	2	1	1	1	2	2	2	2	1	1	2	2	1	1	1	1	1	1	1	2	29
1031	1	1	1	1	1	0	0	1	1	2	1	1	1	2	1	2	1	1	1	0	1	0	0	0	1	2	21

908

AVG.	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	3
MAX.	2	2	2	2	2	2	2	2	2	2	2	3	2	3	3	3	3	2	2	2	2	3	2	2	1	3	

**=Power or Equip. failure: *=Calibration

Synopsis of Average Daily Meterological Station
Readings

10/1989

T. P. MET

WOODS MET

DAY	TEMP	WD	WS	RAIN	RH	TEMP	WD	WS	RAD	RAIN	RH	SIGMA
01	22.9	318	4.8	0.35	-	22.8	333	3.5	148	0.49	-	22.1
02	23.9	337	4.7	0.04	-	23.6	354	3.1	132	0.03	-	28.9
03	24.0	353	5.2	0.74	-	24.1	1	3.5	72	0.92	-	25.8
04	23.9	323	5.0	0.65	-	23.8	339	4.6	134	0.54	-	31.6
05	23.7	323	6.3	0.93	-	23.9	344	4.8	158	1.23	-	42.5
06	24.0	345	5.8	0.09	-	24.2	351	3.5	116	0.08	-	18.4
07	23.7	339	5.1	0.02	-	23.6	355	3.4	76	0.01	-	34.0
08	23.5	349	6.0	0.06	-	23.7	351	3.5	180	0.11	-	43.2
09	22.7	330	4.9	0.05	-	23.8	351	3.9	158	0.05	-	27.0
10	22.8	320	6.5	0.37	-	22.9	345	4.6	156	0.26	-	31.2
11	23.1	360	6.2	0.47	-	22.6	352	4.2	98	0.68	-	43.3
12	23.6	330	5.4	0.10	-	23.1	339	4.4	138	0.06	-	28.5
13	23.2	313	6.8	0.36	-	23.3	339	5.0	140	0.33	-	21.6
14	23.4	324	7.5	0.05	-	23.3	334	4.9	144	0.23	-	38.0
15	21.7	301	4.7	0.09	-	24.2	348	4.0	140	0.07	-	43.0
16	-	-	-	-	-	23.8	351	3.2	110	0.31	-	29.3
17	-	-	-	-	-	23.9	38	4.0	118	0.57	-	37.8
18	-	-	-	-	-	23.0	27	3.8	94	0.40	-	36.2
19	25.6	101	8.7	0.04	-	24.4	85	5.3	128	0.47	-	40.0
20	24.6	51	5.3	0.02	-	25.0	124	5.1	142	0.00	-	27.5
21	24.0	19	5.3	0.01	-	24.1	43	3.5	132	0.00	-	16.0
22	23.8	325	5.2	0.14	-	24.2	332	3.6	142	0.11	-	36.4
23	23.5	327	5.4	0.44	-	23.4	7	4.0	132	0.29	-	29.3
24	22.9	321	6.4	0.18	-	23.1	333	4.5	148	0.28	-	26.4
25	22.9	328	5.8	0.13	-	22.7	356	3.8	156	0.23	-	32.2
26	22.9	327	4.9	0.09	-	23.2	334	3.4	150	0.06	-	27.9
27	22.8	327	5.6	0.09	-	23.0	339	3.6	140	0.17	-	25.2
28	22.5	324	5.4	0.14	-	22.8	338	4.2	144	0.05	-	25.7
29	21.9	316	6.4	0.32	-	22.0	322	5.6	118	0.54	-	27.5
30	22.7	352	6.8	2.19	-	23.0	27	4.6	98	2.88	-	27.2
31	22.8	337	4.5	0.21	-	22.9	350	3.1	130	0.16	-	19.7
AVG	23.3	339	5.7	0.30	0	23.5	359	4.1	131	0.37	0	30.4
MAX	25.6	-	8.7	2.19		25.0	-	5.6	180	2.88		43.3
MIN	21.7	-	4.5	0.01	1000	22.0	-	3.1	72	0.00	1000	16.0
TOT				8.37					4072	11.61		

Meteorology Station Log
SOH-1
10-1-90 to 10-31-90

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1001		1002		1003		1004	
0000	295	3	275	2	50	2	40	2
0100	295	3	260	2	270	3	275	2
0200	285	3	275	3	270	4	280	2
0300	290	3	275	2	270	3	295	3
0400	275	3	270	3	265	2	290	2
0500	280	3	275	3	275	3	280	3
0600	275	4	270	2	275	3	310	3
0700	270	4	280	3	280	2	285	3
0800	275	4	340	3	320	2	295	3
0900	300	3	30	3	40	3	335	4
1000	305	3	45	5	50	3	35	5
1100	325	4	55	6	65	3	40	6
1200	10	4	50	5	60	3	45	7
1300	15	3	65	5	60	4	45	8
1400	45	4	60	4	65	5	40	7
1500	45	4	60	5	70	4	40	7
1600	25	2	45	4	70	5	35	6
1700	60	2	40	3	60	4	30	6
1800	160	2	20	2	55	3	20	4
1900	250	2	35	2	40	2	360	3
2000	260	2	35	2	70	2	310	3
2100	270	2	30	2	70	3	300	3
2200	270	2	330	2	35	4	290	3
2300	270	2	335	3	300	3	260	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1005		1006		1007		1008	
0000	275	3	295	2	285	2	275	2
0100	275	4	300	2	310	2	270	2
0200	275	4	290	2	280	2	270	2
0300	275	3	310	2	280	3	270	2
0400	320	2	310	2	275	2	270	2
0500	275	3	295	2	275	3	275	2
0600	285	3	280	2	295	2	270	2
0700	295	4	295	3	300	2	270	2
0800	320	4	340	5	285	2	295	3
0900	340	5	20	5	325	4	350	4
1000	15	7	40	6	55	7	55	6
1100	20	8	45	7	60	7	80	4
1200	30	8	55	8	45	7	85	5
1300	40	8	60	7	40	6	70	6
1400	40	8	60	6	50	5	80	5
1500	35	7	65	6	55	3	70	4
1600	25	4	70	5	40	2	65	4
1700	45	4	45	3	345	2	50	3
1800	40	3	45	2	285	3	40	2
1900	25	3	45	3	275	3	40	2
2000	10	2	300	2	275	3	40	2
2100	320	2	275	2	270	2	335	2
2200	305	2	270	2	290	3	270	2
2300	290	2	285	2	295	2	280	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1009		1010		1011		1012	
0000	275	2	280	2	300	3	15	3
0100	275	2	290	3	300	3	360	2
0200	290	2	295	3	325	2	360	2
0300	270	3	310	3	35	3	290	3
0400	275	3	325	3	40	4	310	3
0500	275	3	300	3	45	5	285	3
0600	280	3	285	3	45	5	285	3
0700	275	4	300	3	40	4	280	3
0800	295	4	310	4	45	4	340	4
0900	330	4	15	7	40	7	40	6
1000	40	6	20	7	45	8	45	8
1100	45	7	15	7	45	8	40	7
1200	45	8	20	8	25	5	40	7
1300	45	7	20	8	35	6	35	7
1400	40	8	20	8	45	3	35	7
1500	40	7	15	8	50	5	40	7
1600	35	6	15	7	35	4	40	6
1700	35	5	20	6	40	5	30	5
1800	30	4	10	4	35	4	25	4
1900	15	2	350	5	30	4	340	3
2000	15	2	330	3	25	3	310	3
2100	335	2	300	3	20	3	270	3
2200	285	3	300	3	25	3	275	4
2300	275	3	295	3	25	3	270	4

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1013		1014		1015		1016	
0000	275	3	310	4	310	3	295	3
0100	280	3	295	3	290	3	295	2
0200	275	3	285	4	300	3	285	2
0300	275	3	300	5	290	3	280	2
0400	280	3	290	4	285	3	290	2
0500	275	3	295	4	310	3	295	2
0600	280	4	310	4	310	5	290	2
0700	280	3	320	5	290	4	295	2
0800	325	4	335	7	310	4	305	3
0900	335	4	350	8	360	5	40	4
1000	350	6	360	7	10	6	55	5
1100	15	7	20	8	35	8	60	5
1200	30	8	45	8	40	8	45	7
1300	40	7	45	8	30	8	50	6
1400	40	6	35	7	30	8	60	5
1500	30	6	35	6	30	7	60	6
1600	25	4	25	5	35	7	70	6
1700	345	3	15	3	25	5	60	5
1800	290	4	15	3	15	4	45	2
1900	295	3	35	4	10	3	40	2
2000	285	4	25	3	20	3	340	2
2100	305	4	15	3	40	3	310	3
2200	310	5	350	3	315	2	270	4
2300	305	4	325	3	285	3	285	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1017		1018		1019		1020	
0000	300	3	55	3	60	3	50	2
0100	280	3	50	3	70	3	45	2
0200	290	3	40	2	70	3	60	2
0300	295	3	35	2	100	3	65	2
0400	290	3	340	3	85	2	65	2
0500	285	3	290	3	255	3	65	2
0600	295	3	285	3	75	2	65	2
0700	60	4	275	3	345	3	60	3
0800	325	3	285	4	90	4	115	4
0900	325	4	300	4	80	5	110	4
1000	355	5	300	4	80	4	120	4
1100	45	7	335	4	100	4	110	4
1200	50	8	360	4	85	4	120	4
1300	45	7	45	5	95	4	130	4
1400	50	7	60	5	105	5	130	4
1500	50	7	65	5	105	4	125	4
1600	45	6	60	4	105	3	120	5
1700	40	5	60	3	110	3	110	3
1800	45	4	45	3	120	3	110	3
1900	50	4	65	4	90	3	95	3
2000	55	5	55	3	125	3	95	3
2100	60	4	65	3	135	2	45	2
2200	55	4	55	3	125	2	70	2
2300	55	4	55	3	55	2	75	2

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1021		1022		1023		1024	
0000	80	2	60	3	265	6	290	3
0100	90	2	65	2	270	4	300	3
0200	90	2	65	2	270	4	280	3
0300	90	2	65	2	260	3	285	3
0400	90	2	65	2	270	2	295	4
0500	85	2	50	2	270	3	290	5
0600	80	2	285	3	275	2	310	4
0700	65	2	275	3	275	3	310	4
0800	5	2	310	4	305	3	325	3
0900	70	3	355	6	335	4	30	5
1000	85	3	25	7	360	4	350	5
1100	95	3	35	7	25	4	35	6
1200	105	3	40	7	45	5	40	6
1300	100	3	40	7	50	5	45	7
1400	110	4	30	8	65	4	35	6
1500	95	4	25	7	65	4	35	6
1600	85	3	30	6	60	4	25	5
1700	70	4	20	4	45	4	50	7
1800	60	3	340	3	50	4	335	4
1900	55	2	315	3	35	3	305	3
2000	55	2	340	3	15	3	345	5
2100	50	3	300	4	25	5	295	2
2200	55	3	50	2	10	3	275	3
2300	60	3	275	4	280	4	285	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1025		1026		1027		1028	
0000	390	3	350	2	270	2	275	3
0100	290	3	275	2	290	2	270	3
0200	275	3	270	2	285	3	275	3
0300	280	3	270	2	275	3	275	3
0400	270	3	270	2	275	3	280	3
0500	280	3	270	2	275	4	315	4
0600	285	3	270	2	285	4	15	5
0700	285	3	275	2	300	3	40	5
0800	310	4	280	4	330	4	50	7
0900	305	3	325	5	35	5	50	7
1000	45	7	345	5	50	7	45	8
1100	55	8	30	5	40	8	55	9
1200	45	7	45	6	45	7	45	8
1300	50	7	40	6	45	7	35	5
1400	40	7	30	5	55	7	15	4
1500	40	6	45	6	20	3	10	3
1600	40	4	40	5	330	2	360	4
1700	30	3	40	3	320	2	305	3
1800	25	3	25	2	285	2	280	4
1900	20	2	30	2	275	2	280	3
2000	10	2	40	2	270	3	280	3
2100	40	2	40	2	275	3	275	4
2200	40	2	275	3	270	4	275	3
2300	40	2	270	2	275	3	270	3

Time	W/D	W/S	W/D	W/S	W/D	W/S	W/D	W/S
	1029		1030		1031			
0000	275	3	285	4	270	2		
0100	280	3	285	4	285	2		
0200	280	3	290	3	285	2		
0300	295	3	285	3	280	2		
0400	280	3	280	4	285	2		
0500	290	3	330	3	290	3		
0600	280	4	95	4	285	3		
0700	280	4	65	3	265	2		
0800	285	5	75	4	275	3		
0900	290	4	90	4	325	3		
1000	290	4	120	3	45	3		
1100	320	4	85	4	55	4		
1200	10	6	90	4	60	5		
1300	20	6	95	3	45	5		
1400	25	7	70	5	60	4		
1500	40	6	60	5	65	3		
1600	40	5	55	4	60	3		
1700	40	5	35	3	45	2		
1800	45	5	50	2	45	2		
1900	45	4	50	2	45	2		
2000	45	6	340	3	45	2		
2100	45	4	270	2	60	2		
2200	310	3	275	2	40	2		
2300	300	3	275	2	75	2		

